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ABSTRACT

Mastery learning is a behavioral instructional method that utilizes additional learning time and repeated testing opportunities to increase student learning. While successful in higher education, mastery learning has not been studied in social work. In this study mastery and non-mastery learning instruction were contrasted using four sections of a junior-level introductory social work course in a public, Northeastern college. The four course sections were collapsed into two groups, mastery and non-mastery. Dependent variables included student achievement, instructional preference, and attitudes toward course topic. Instructor hours spent and instructor reactions to mastery learning were measured. Both methods resulted in similar achievement and similar changes in attitudes towards the course topic. All of the students preferred mastery instruction. Mastery and non-mastery instruction involved similar amounts of instructor time, but the mastery instructor reported increased classroom time efficiency and coordination between teaching and testing. Mastery learning should be considered a promising instructional method for social work education. (Contains 6 tables and 72 references.) (JDM)

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A study of mastery learning versus non-mastery learning instruction in an undergraduate social work policy class.

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A study of mastery learning versus non-mastery learning instruction in an undergraduate social work policy class.

ABSTRACT

Mastery learning is a behavioral instructional method utilizing additional learning time, and repeated testing opportunities to increase student learning. While successful in higher education, mastery learning has not been studied in social work. Mastery and non-mastery learning instruction were contrasted using four sections of a BSW course with identical content and exams. One instructor taught two course sections with mastery learning, another instructor taught two sections with non-mastery instruction. Dependent variables included student achievement, instructional preference and attitude toward course topic. Instructor hours spent and instructor reactions to mastery learning were measured.

Both methods resulted in similar achievement and similar changes in attitude toward course topic. 100% of students preferred mastery instruction. Mastery and non-mastery instruction involved similar amounts of instructor time, but the mastery instructor reported increased classroom time efficiency and coordination between teaching and testing. Mastery learning should be considered a promising instructional method for social work education.

PROBLEM

It can be confusing for new social work educators to decide on which teaching method to employ in their classrooms. Novice social work educators who review the literature in social work education and educational psychology for guidance will find that many teaching methods investigated in the encyclopedic Handbook of Research on Teaching (McKeachie, 1963; Dunkin & Barnes, 1986; Trent & Cohen, 1973) also have been investigated by social work educators. Examples include (a) the lecture and discussion methods (b) integrated learning and teaching, (c) team teaching, (d) andragogy, (e) audio taping, (f) the Keller personalized system of instruction, and (g) laboratory training (Butler & Elliot, 1985; Dolon, Blakely & Hendricks, 1988; Feldman, 1958; Katz, 1979; Kilpatrick, Thompson, Jarrett & Anderson, 1984; Lee & Kenworthy, 1929; Lowry, Bloksberg & Walberg, 1971; McKeachie, 1963; Perlman, 1949, 1951; Tufts, 1923; Wright, 1954; Zastrow, 1979). However, the outcome based teaching method called mastery learning has been used successfully in higher education but has yet to be investigated in social work education.

PURPOSE

Novice (and perhaps veteran) social work educators will probably have three main questions when considering whether to employ an alternative teaching method like mastery learning in their classrooms. (a) Will mastery learning impact student achievement in my social work course? (b) How will my students react to being taught with mastery learning? (c) How will I react to teaching with mastery learning? This first

study of mastery learning in social work education tries to address these three main questions by examining how mastery learning, compared to non-mastery learning instruction, performed in an undergraduate social work (BSW) course. Several areas of difference related to achievement, student reactions and instructor reactions were investigated in order to offer social work education as full a picture as possible in this first study of mastery learning.

Both quantitative and qualitative data were collected. Qualitative methods are often employed in educational settings to collect data about the experience of students or teachers and to enrich quantitative data (Clandinin & Connelly, 1994). In this study, qualitative methods were employed to examine student and social work instructor reactions to mastery learning.

Literature Review

Mastery learning is the group-based implementation of the Carroll model of school learning. The Carroll model suggests learning is dependent on the amount of: time needed to learn and time allowed to learn (Carroll, 1963). Learning should increase as time allowed increases. In other words, achievement is held constant and time allowed is varied, instead of holding time constant (e.g., one semester) and allowing student achievement to vary (Bloom, 1968, 1984; Carroll, 1963). Mastery learning involves using time flexibly to increase student learning and performance. For example, students are often given time to retake parallel versions of exams or rewrite projects until reaching mastery. The additional time allows students to clarify poorly understood material before retesting.

Distinguishing features of mastery learning include (a) curriculum alignment, (b) formative evaluations, (c) feedback and correctives, (d) retesting cycles, and (e) criterion referenced grading (Anderson, 1993; Bloom, 1968, 1984; Guskey, 1987; Kulik, Kulik & Bangert-Drowns, 1990). Each is briefly described to give readers a fuller picture of mastery learning. Vertical and horizontal curriculum alignment involves the similarity of course content taught and tested (Guskey, 1985; Cohen & Hyman, 1991). Horizontal curriculum alignment refers to the linear progression of course material from lesson planning through teaching and testing. Vertical curriculum alignment refers to the hierarchical nature of Bloom's (1956) taxonomy of six educational objectives (e.g., knowledge, comprehension, application, analysis, synthesis, and evaluation). Vertical curriculum alignment means course material is taught and tested according to the same knowledge level because understanding course content at lower levels (e.g., knowledge) does not guarantee understanding at higher levels (e.g., synthesis).

Formative evaluations commonly take the form of short ungraded quizzes and will be referred to in this study simply as quizzes. Quizzes are intended to monitor learning progress and, therefore, often do not count toward final grades (Bloom, Hastings & Madaus, 1971). Summative evaluations are a normal part of higher education and normally take the form of graded exams (objective or other format). Feedback refers to instructors' providing information on student learning progress. Correctives refer to correcting student learning errors by re-teaching material, providing remedial material, or using other methods. Re-testing cycles usually refers to taking parallel forms of exams. The parallel forms are commonly called make-up exams and they often have the same number and type of questions as on an exam but phrased differently and with

different response choices. In mastery learning, "make-up exams" are often open to all students who voluntarily wish to retake an exam to improve their grades and are not something students take when they failed to attend or "missed" an exam. Make-up exams should be as difficult, or more difficult, so any increased achievement is less likely the product of "easier" tests.

Mastery learning uses criterion-referenced instead of norm referenced measurement to grade student performance (Bloom, Hastings & Madaus, 1971). Criterion referenced measurement compares performance to a standard, whereas, norm-referenced measurement (the normal curve) compares performance of other students. Criterion referenced measurement may produce score distributions that deviate from a normal curve because it is possible for all students to meet the criterion (Gronlund, 1981). Criterion referenced measurement is consistent with a fundamental belief of mastery learning that all students are capable of achieving higher levels with clear learning goals and, if given enough time, feedback and correctives.

What does the research reveal about the effectiveness of mastery learning on achievement? Mastery learning has generated enough research to merit two syntheses of research that include 31 college level studies in the social sciences, hard sciences, health sciences, and languages, but not social work (Guskey & Pigott, 1988; Kulik, Kulik & Bangert-Drowns, 1990). A synthesis of research is useful for comparing studies that report results in different ways by converting results to "effect sizes" (Glass, McGraw & Smith, 1981). In education, an effect size is loosely translated as a standard deviation or a letter grade. Proponents of mastery learning claimed it could produce achievement gains of two standard deviations or an effect size of 2.0 (Bloom, 1977). Of 31 college

level mastery learning studies, 29 had positive effect sizes ranging from a low of +.18 (little effect on academic achievement) to a high of +1.69 (large positive effect on achievement). The average effect size of +.50 (mild positive effect) was stronger than those found for peer tutoring, computer-based teaching, programmed instruction, and open education (Kulik, Kulik & Bangert-Drowns, 1990). Mastery learning has had mainly positive results on academic achievement.

How have students reacted to being taught with mastery learning? Students have had mainly positive reactions to mastery learning and made positive changes regarding attitudes toward course topic (Bauman, 1980; Brown, 1977; Goldwater & Acker, 1975; Guskey & Pigott, 1988; Kulik, Kulik & Bangert-Drowns, 1990; Whiting & Render, 1984). Instructors have reported both positive and negative reactions teaching with mastery learning. Positive instructor reactions include increased consistency between what was taught and tested and increased classroom time efficiency (Dunkle, 1984; Fitzpatrick, 1985; Guskey, 1985, 1988; Guskey & Pigott, 1988; Guskey, Benninga, & Clark, 1984; Kulik, Kulik & Bangert-Drowns, 1990; Robb, 1985; Squires, 1986; Wire, 1979). Negative instructor reactior involve mastery learning being time intensive (Abrams, 1979; Arlin, 1984; Barber, 1979; Brown, 1977; Burns, 1987; Decker, 1989; Dunkleberger & Knight, 1979; Fitzpatrick, 1985; Guskey, 1985; Honeycutt, 1974; Klein, 1979; Levine, 1985; Lewis, 1984; Nepote-Adams, 1991; Palardy, 1986). However, one research synthesis found mastery learning required only 4% more instructional time than control groups (Kulik, Kulik & Bangert-Drowns, 1990).

In higher education, mastery learning has generated positive results on student achievement and students reacted positively to mastery learning. Would this be the case in social work education?

METHODOLOGY

Sample

This study occurred in a public, Northeastern, urban, commuter/resident college that enrolled approximately 12,000 students. The Social Work Department had 275 students and nine full-time faculty. A convenience sampling plan generated 137 students registered in four sections of a junior-level introductory social work course that addressed poverty, the poor, anti-poverty strategies, and attitudes toward poverty. Lack of random assignment negates internal validity but may strengthen ecological validity because this study occurred in an actual college classroom under normal conditions (Gentile, 1990). Sample demographics are reported so readers can decide if their classrooms are similar enough to generalize the results of this study (Cornfield & Tukey, 1956). To decrease registration based on instructor preference or reputation, all course sections listed the instructor as "STAFF."

The four course sections were collapsed into two groups, mastery and non-mastery. Independent t-tests showed both groups had similar distributions of (a) age (Mean= 24 years; range: 18-45 yrs), (b) entry grade point average (Mean= 2.9 of 4.0), and (c) entry knowledge levels (37.7% of 100% on a knowledge pretest). A Chi-square showed both groups had similar distributions of (a) gender (Female: 77%, Male: 23%),

(b) race, (White: 82%, Black: 11%, Hispanic: 4%, Asian: 2%, other: 1%) and (c) academic major (SW: 28%, Non-SW: 72%). As expected for an introductory level course, most students were non-social work majors. The sample was primarily white, female, with a mean age of 24 years.

Similarities between the course sections included course content, readings, texts, exams, enrollment, and meeting days. Differences included meeting times, instructional methods, and instructors. The mastery instructor was a Hispanic male with seven years of teaching experience, all with mastery learning. The non-mastery instructor was a white female with 21 years of teaching experience, none with mastery learning. Any instructor bias favored the non-mastery instructor because she had more teaching experience than the mastery instructor, had been recognized for teaching excellence, and her course content was used by the non-mastery instructor.

Independent Variable

The independent variable was the instructional method. Mastery learning and non-mastery learning instruction were contrasted. Mastery learning was implemented in this study using (a) curriculum alignment, (b) three written study guides distributed to students, (c) six ungraded quizzes, (d) three graded exams, (e) one make-up exam for each exam, and (f) instructor-led feedback and correctives, both in-class and outside class. Taken together this meant a student received a study guide and used a mix of lectures and text to answer the study guide questions. They took an ungraded quiz on the first half of the study guide, scored it and asked questions in class about incorrectly answered items. This was repeated for the second half of the study guide. The students

took a graded exam and again asked questions in class about incorrectly answered items. Students who took a makeup exam attended the outside class review session to ask more questions about incorrectly answered exam questions before taking the makeup exam. This cadence was repeated three times during the semester.

Non-mastery instruction most resembled a combination of the lecture and discussion methods. The non-mastery instructor simply taught as she normally did, not using quizzes, study guides, make-up exams, or review sessions. Both instructional methods used the same exams and criterion-referenced grading.

Design

A quasi-experimental, repeated measures design using four sections of the same 16-week, undergraduate social work course was employed (Campbell & Stanley, 1966). One instructor taught two sections with mastery learning and the other instructor taught two sections with non-mastery instruction. Having both instructors teach with both instructional methods was not feasible for this study. Open ended student comments reported elsewhere (Aviles, 1996) suggest that students reacted to the instructional method and not their instructor.

It is always possible that any differences in results found between two groups were the result of factors other than instructional method. The design in this study helped control for several threats to internal validity. The internal validity threats of history and maturation were controlled in this study because both groups were equivalent and were studied simultaneously (Campbell & Stanley, 1966). The internal validity threat of instrumentation was controlled by having the mastery instructor

explain, distribute, and collect from both groups the consent forms and measures of pre-knowledge, instructional preference, and attitudes toward course topic.

The internal validity threat of "testing" could not be controlled because the mastery group had nine more testing opportunities than the non-mastery group, in the form of six quizzes and three make-up exams (as shown in table one). However, frequent testing is considered a main effect of mastery learning and equalizing the testing between the groups would have made non-mastery instruction more like mastery learning, thus weakening the contrast.

Dependent Variables

Several dependent variables were measured to generate a fuller picture of mastery learning for social work education. Academic achievement was included because achievement is the "hard currency" of education. Achievement is defined in this study as performance on academic testing expressed as the percent of questions answered correctly of 100%.

Negative student reactions should be cause for concern despite any positive achievement results. If students disliked the teaching method, their dislike may have generalized to the course topic or the instructor. Therefore, attitudes toward mastery learning and attitudes toward several aspects of poverty were measured. Standard course evaluations were included to examine if students responded negatively to the instructor teaching with mastery learning.

Negative instructor reactions to a teaching method also should be cause for concern. Instructor hours spent during the semester were included as a rough indicator

of labor intensiveness. The mastery instructor recorded their reactions to implementing and teaching with mastery learning throughout the study.

Measures

All measures were instructor-created, except for the standard social work department course evaluation form and the measures of attitude toward the poor (Grimm & Orten, 1973; Howard & Flaitz, 1982; Moran, 1989; Rosenthal, 1993; Sharwell, 1974). The doctoral committee that guided this research checked the validity of the instructor-created instruments.

Table 1. Instrument Summary: Groups and Times Administered

Administered	Instrument	Groups
Pre-Instruction	Demographic survey & Entry knowledge level	Both
During instruction	Three exams	Both
	Three make-up exams & Six ungraded quizzes	Mastery Only
Pre, Post Instruction	Attitudes toward course topic	Both
Post-Instruction	Course evaluations & Instructional preference	Both
	Mastery attitude survey	Mastery Only

Achievement

Three 50-item instructor created exams measured academic achievement in both groups. Three 50-item make-up exams (one per exam) were created for the mastery group and tested the same content as the exams but with different questions. To increase exam reliability, all exams used the multiple choice, objective format

(Gronlund, 1981; Roid, 1982). Exam validity was established in four ways. First, the mastery instructor "attended" the non-mastery instructor's course to match all course content. Second, the mastery instructor created or revised 421 test questions that matched the non-mastery course content. Third, a table of specifications was created to focus instruction and testing on essential content and to prevent testing material not taught (or the reverse) (Gentile, 1990). Fourth, the non-mastery instructor verified that the exams and make-up exams covered her course content although she did not utilize the make-up exams.

It was crucial to insure the exams and make-up exams were equivalent since in the mastery group, a student's make-up exam score would replace what he/she scored on the exam. Any achievement gains would be suspect if a make-up exam was easier than the original exam. To test if the exams and make-up exams were equivalent, they were piloted during the previous year by combining them into three, 100 item exams (exam 1 + make-up exam 1; exam 2 + make-up exam 2, exam 3 + make-up exam 3). Students took the combined 100 question exams and the 50 item "halves" were scored and compared. At least 76% of students who scored above or below 70% on an exam also scored the same on the make-up exam suggesting equivalence. Further, exam and make-up exam equivalence was examined with the difficulty index statistic that shows how often test items were answered correctly (Gronlund, 1981; Gentile, 1990). The difficulty index has a range from zero to 1.0 (item answered correctly by zero = everyone, by 1.0 = no one). Each exam and matching make-up exam was within .1, suggesting they were equally difficult. A knowledge pre-test included four questions taken from each exam, each with a difficulty index of at least .6 in the pilot test. Six

ungraded quizzes were employed in the mastery group but were not intended to generate achievement data.

As shown in table two, four instruments previously used with social work students measured student attitudes toward (a) the poor, (b) public assistance, (c) poverty, and (d) socio-political concerns (Grimm & Orten, 1973; Howard & Flaitz, 1982; Moran, 1989; Orten, 1979; Rosenthal, 1993; Sharwell, 1974). The original articles describe the validation of the instruments. Pilot testing in the host course revealed the instruments had adequate reliability and stability.

Table 2. Measures of Attitudes toward Course Topic

Name of Measure	Source	Items	Measures attitude toward
Peterson's Poor Scale	Peterson, 1967	40	The poor
Attitude toward public assistance scale	Anderson, 1965, 1966	16	Public assistance
Attitude toward poverty scale	Rosenthal, 1993	21	Causes of poverty; internal, structural, antipathy
Social Humanistic Ideology Scale	Howard & Flaitz, 1982	20	Socio-political concerns, Subscales: social justice, human nature

Peterson's Poor Scale (Peterson, 1967) measures favorable and unfavorable attitudes toward the poor. The Social Humanistic Ideology Scale (Howard & Flaitz, 1982) measures agreement/disagreement with statements related to social justice and human nature. The attitude toward poverty scale measures antipathy toward the poor and the belief poverty results from internal or external causes (Rosenthal, 1993). The

attitude toward public assistance scale measures agreement/disagreement with statements about public assistance (Anderson, 1965, 1966).

Student Reactions

Preference for instructional method was measured with one instructor-created, fixed-response question: Would you prefer mastery or non-mastery instruction if the semester were beginning again? Standard social work department course evaluations collected data from both groups regarding the instructor and the course. The course evaluation had 16 positively phrased questions with a five-point Likert scale and response choices from strongly agree to strongly disagree.

Student attitude toward mastery learning was measured by six fixed-response questions that generated ordinal data. Five fixed-response questions used a four-point Likert scale with a response choice of 'helpful' (extremely, very, somewhat, of no help). The questions addressed the helpfulness of five mastery learning elements: (a) student study guides, (b) ungraded quizzes, (c) provision of answer keys and in class review sessions, (d) outside class review sessions, and (e) make-up exams.

Social Work Instructor Reactions

An instructor-created weekly calendar collected self-reported data from both instructors about the number of hours spent with students outside class time. The mastery instructor kept a log throughout the study that contained qualitative data about implementing and teaching with mastery learning. The log had seven pre-coded sections, one for each mastery element, in order to make the data collection and analysis more complete (Lincoln & Guba, 1985).

RESULTS

Quantitative data were analyzed using SPSS and alpha levels of .05. Student comments suggest they reacted to mastery learning and not the mastery instructor. Qualitative data from the students and the mastery instructor were examined with the constant comparison method (Lincoln & Guba, 1985). The method involves choosing a unit of analysis (student and social work instructor comments) and categorizing all the units by similarity of content (Lincoln & Guba, 1985).

Achievement

The achievement data was examined with a repeated measures MANOVA (Multiple Analysis of Variance) since two teaching methods (mastery, non-mastery) and three achievement tests (exam 1-3) were involved. Since a student's make-up exam score replaced his/her original exam score in the mastery group, the make-up exam scores were examined first.

Seventy-nine make-up exams were taken in the mastery group and a make-up exam score replaced a student's original exam score. Exam score gains were examined by pairing a student's make-up exam score with what he/she scored on the exam. Table three includes mean exam and make-up exam scores for students who took make-up exams. Paired t-tests showed significant make-up exam score gains over original exam scores and an average gain of 12.67 points.

Table 3. Mean Make-up Exam Scores and Corresponding Exam Scores

	Make-up Exams Taken		Original Exam Score		Make-up Exam Score		Change
Exam 1	29	M SD	74.70	10.00	90.80	7.30	+16.10**
Exam 2	22		77.10	9.90	82.10	5.50	+5.00*
Exam 3	27		66.00	8.90	83.00	8.70	+17.00**
Total	N = 79						

Note. *p<.01 **p<.0001

Table 4. Mean Exam Scores after Make-up Exam Score Replacement

	Mastery		Non-Mastery		Difference
	M	SD	M	SD	
Exam 1	88.00	7.90	82.10	11.50	5.90*
Exam 2	86.40	7.90	83.90	10.80	2.50
Exam 3	81.70	7.80	79.00	11.70	2.70

Note. * p<.05

After the 79 make-up exam scores replaced the original 79 exam scores in the mastery group, the MANOVA detected an "ordinal" interaction effect between instructional method and tests ($F(2,399)=3.20$, $p<.05$). An ordinal interaction means one group outscores another group but not to the same degree (Glass & Stanley, 1970; Lubin, 1961). Differences between groups can be examined when an ordinal interaction occurs. The mastery group outscored the non-mastery group on all three exams, but the difference ranged from a low of 2.5 to a high of 5.9 points. The instruction variable was significant ($F(1,399)=6.49$, $p<.05$) indicating a difference between the mastery and non-mastery groups on achievement. Independent t-tests showed the 5.9 point

difference between the exam one scores accounted for the difference on achievement between the groups ($t_{(132)}$=-3.47, p=.001, two-tailed).

In summary, the mastery group outscored the non-mastery group when make-up scores were considered (effect size = +.33) but both groups achieved similarly when make-up exam scores were not considered (effect size = -.12). The mean gain of 12.67 points on the make-up exams (the equivalent of more than one full grade level) raised the mean achievement scores of the whole mastery group.

Supplementary Achievement Results

Course grades are reported for descriptive purposes only in table five, using a mean score of the three exams. Exam scores were converted to letter grades with standard numerical cutoffs (A = 90-100%, B = 80-89%, etc.).

Table 5. Final Grade Distribution using Letter Grades

	Mastery group		Non-mastery group	
Letter grade	n	%	n	%
A (90-100%)	20	29%	17	25%
B (80-89%)	36	53%	26	38%
C (70-79%)	12	18%	17	25%
D (60-69%)	0	0	6	9%
F (50-59%)	0	0	2	3%

Letter grades of A or B were earned by 82% of the mastery group, and 63% of the non-mastery group. The whole mastery group (100%), and 88% of the non-mastery group earned a grade of C or better. Although both groups had similar mean exam scores, the mastery group had a greater percent of A, B, and C grades and no D or F grades.

Student Reactions

Attitudes toward Course Topic

A MANOVA also was used to examine student attitudes toward the course topic, because there were seven attitude measures. The MANOVA showed no interaction effects and no differences between the mastery and non-mastery groups. However, the MANOVA showed that changes in attitude toward course topic did occur in both groups from pre- to post-testing ($F(7,123)=9.84$, $p=.0001$). Paired t-tests showed pre-post changes on four of the seven measures, including attitudes toward (a) the poor ($t_{(130)}=4.15$, $p=.0001$), (b) social justice ($t_{(130)}=6.17$, $p=.0001$), (c) human nature ($t_{(130)}=-5.97$, $p=.0001$), and (d) individual causes of poverty ($t_{(130)}=3.91$, $p=.0001$). The direction of the scales suggests that positive changes occurred in both groups.

Instructional Preference

A chi-square showed a relationship existed between group and student preference for instructional method ($X^2_{(1)}=52.40$, $p=.01$). The entire mastery group (100%) preferred mastery to non-mastery instruction, while 43% of the non-mastery group preferred mastery instruction based on a description. More students than expected preferred mastery learning.

Student Attitude toward Mastery Learning

Quantitative ratings of how helpful students found the individual mastery learning elements were first collapsed into one mean score for an overall rating. Quantitative results showed that 93% of the students rated mastery learning as being either "very" or "quite" helpful to their learning (Table 6). Only 3% of the students rated mastery

learning as "not" helpful to their learning. The overall student rating of mastery learning was positive.

Table 6. Overall Student Rating of Mastery Learning

		Helpfulness of Mastery Learning			
	N	Very	Quite	Somewhat	Not
Total Ratings	344	78%	15%	4%	3%
Study Guides	71	80%	14%	6%	0%
Quiz	71	89%	10%	1%	0%
Answer keys & In-class Review	71	78%	14%	8%	0%
Outside class Review	65	63%	23%	5%	9%
Make-up Exams	66	82%	8%	2%	8%

The quantitative results were then separated to see how students rated the individual mastery elements. Quizzes were the highest rated individual mastery element with 99% of students rating quizzes as "very," or "quite" helpful to their learning. The outside class review sessions were the lowest rated mastery element, but 86% of students still rated them as "very," or "quite" helpful to their learning (Table 6). Ratings showed that students found all the mastery elements to be helpful to their learning.

Course Evaluations

Both instructors received similar positive ratings on the standard social work department course evaluation form ($t_{(123)}$=-.85, p=.40). The rating scale for the positively phrased questions ranged from 5.0 (strongly agree), to zero (strongly disagree). Both instructors received positive ratings (Mastery: Mean = 4.8 of 5.0, SD = .57; Non-mastery: Mean = 4.7, SD = .71).

Social Work Instructor Reactions

Time Spent

Data collected from the instructor created calendars were examined for descriptive purposes only for an idea of how much time both instructors spent outside class time with students. The non-mastery instructor spent 14.25 hours outside class time over the semester and recorded 14 student contacts during office hours. The mastery instructor spent 21 hours outside class time and recorded 79 student contacts in both outside class correctives and make-up exams. The mastery instructor spent 6.75 more hours per semester with students outside class time but saw 65 more students compared to the non-mastery instructor.

Overall Instructor Reactions

The implementation log kept by the mastery instructor generated 30 pages of single spaced narrative. Log entries were first examined for overall themes and then reexamined to see how the social work instructor reacted to each mastery element. Overall examination of the implementation log revealed that the mastery instructor spent time differently from the non-mastery instructor. The mastery instructor created all materials and testing before instruction began. In contrast, the non-mastery instructor normally chose instructional objectives first, taught them, and created the exams. Also different was the amount of time spent with students outside class and the number of students helped. The group review sessions ended up functioning as office hours and no students attended the mastery instructor's office hours.

To examine overall instructor reactions to mastery learning, instructor comments

were re-sorted into categories of positive, negative or neutral. The positive comments suggested mastery learning helped the mastery instructor: (a) focus on essential material during test creation and instruction, and (b) become more time efficient in the classroom by spending less instructional time on nonessential content. The negative instructor comments about implementation involved the time spent (a) creating the table of specifications, (b) writing the 227 additional test items for three make-up exams and six quizzes, (c) aligning and assembling the study guides, make-up exams and quizzes, and (d) maintaining the 450-item test bank. Preparing all course materials before instruction began was initially noted as a negative because the time needed to do this was unknown. However, time spent was not a factor once course materials were created. The results show both positive and negative instructor reactions to mastery learning.

Instructor Reactions to Mastery Elements

Positive and negative instructor comments were then examined for each mastery learning element. Positive comments about curriculum alignment referred to increased instructor focus on essential material, and suggested the table of specifications helped coordination of study guides, test items, and other course materials. Negative comments about curriculum alignment referred to insuring all instructional material was taught and tested to the same proportions as "tedious."

Positive comments about study guides showed they helped the mastery instructor track content covered in each class. Ungraded quizzes and in-class review sessions helped the mastery instructor correct student learning errors and clarify unclear material. Ungraded quizzes also helped pilot testing of new test items without

hurting student grades. Negatives about quizzes and in-class reviews included the discovery of "faulty teaching" (or a faulty test item) when most, or all, students answered quiz questions incorrectly. Faulty teaching was corrected during in-class reviews but noted as negative because the mastery instructor simply disliked identifying it during class. Another negative of in-class correctives happened when students argued for incorrect answers for the sake of argument ("This is a bad question because I got it wrong", "I think the answer I picked should be the correct answer" <Why?> "Because!"). Positive comments about outside class review sessions and make-up exams revealed it was a positive experience to help students correct their errors and to help students raise their level of understanding and exam scores. Negative comments about outside class review sessions and make-up exams involved arranging rooms and times rather than the process itself.

DISCUSSION

Was mastery learning effective in a BSW level social work course? Yes. Mastery learning generated achievement results that were at least similar, and in no instance worse, than non-mastery instruction. Both the mastery and non-mastery learning groups made similar positive changes in attitudes toward the course topic of poverty suggesting that social work educators who use mastery learning will not sacrifice student attitude change for achievement, or the reverse. Students overwhelmingly preferred mastery learning and rated both instructors similarly on the course evaluations. Teaching with mastery learning did not require an excessive

amount of instructor time and the mastery instructor had mainly positive reactions to using mastery learning instruction.

Clearly, the make-up exams resulted in the mastery group outscoring the non-mastery group. The average make-up exam score gain of 12.67 points suggests that achievement can improve during the confines of a semester and that increased learning does depend on increased time allowed and increased learning error correction (Bloom, 1968; Carroll, 1963). Make-up exams also may have increased student motivation to achieve since 62% of make-up exams were taken voluntarily by students who had already scored at least 70% on the exams. The gains also suggest, quite rightly, that mastery learning is more effective with retesting cycles. Retesting cycles are an essential feature of mastery learning and are predicted to result in achievement gains, if learning errors are corrected (Bloom, Hastings & Madaus, 1971; Decker, 1976; Fehlen, 1976; Omelich & Covington, 1981). Without correctives, students could take a make-up exam and simply repeat the mistakes they made on the exam. As evidence of uncorrected learning errors, this instructor noted that with the quizzes, the mastery group asked few clarification questions before but many questions afterward. Social work educators will find that using quizzes and correctives helps in detecting and remedying student learning errors.

It may be argued that "retesting" is already evident in advanced social work courses where students write and rewrite intervention plans or receive supervision and repeated opportunities to reach learning goals set in field work. Social work educators who utilize additional rounds of make-up exams or more correction of learning errors may obtain even greater achievement gains than found in this study. Greater

achievement implies better preparation for future social work courses, especially in multi-part courses where early learning supports later learning.

The 100% student preference for mastery learning suggests students experienced mastery learning more positively than expected. Course evaluations showed students rated both instructors similarly although the non-mastery instructor was more experienced than the mastery instructor and her course content was used for the contrast. Social work educators may obtain greater positive achievement results when using their own course content.

Social Work Instructor

Mastery learning involved a reasonable amount of instructor time spent and many of the instructor comments involved how time was spent. Teaching with mastery learning meant the mastery instructor prepared all course materials before instruction began which allowed more time during the semester for other faculty responsibilities. Both the mastery and non-mastery instructors agreed this was preferable to creating materials during instruction or writing exams the night before they are given. The mastery instructor did not record the implementation time spent but described it as a negative. The mastery instructor spent more time creating exams and quizzes simply because more test questions were required. However, implementation time was not a factor once materials were created. Social work educators who teach with mastery learning should expect to initially spend more time creating course materials than they would with other instructional methods.

The mastery instructor reported feeling "time efficient" inside the classroom.

Increased time efficiency inside the classroom may be partially due to the relationship between teaching and testing. For example, an instructor who teaches with mastery learning tests all material taught and not a fraction of material taught. Therefore, time spent on essential content can be increased by spending less (or no) time on nonessential content instead of by 'teaching 'faster.' This can be accomplished by closely following the course outline during instruction or by having a social work educator determine if issues raised in class support or sidetrack the terminal outcomes for his/her course. Both the mastery instructor and the students agreed to being "sidetracked or getting off on tangents" when issues raised in class were not on the course outline nor would appear on the exams. Every social work educator must decide if issues raised in class support the goals of the course directly, indirectly, or not at all.

Time efficiency outside class was attributed to using the group format correctives. It was much more practical to correct students and give make-up exams as a group than to do it one-on-one during office hours. For example, individually correcting the 79 students who took make-up exams (assuming a one-hour office visit) would have required 79 additional hours. Had individual correctives been employed, this writer would have concluded that mastery learning was too time intensive for social work education! The mastery instructor believed the positives of teaching with mastery learning outweighed the negatives although no rating system was employed.

Novice social work educators (and perhaps veteran educators as well) should find that the explicitness of the mastery learning elements and procedures offers direction with the planning and organization of course materials. However, instructors

also can expect increased responsibility for what happens in the social work classroom since behavioral teaching methods rely heavily on the instructor to plan, direct, and manage the learning process. Social work educators also can expect increased responsibility for the detection and correction of student learning errors. Additionally, social work educators should ready themselves for the questions, comments, and critiques they will get from sharing the answer keys to exams and allowing students to ask questions about the exam items and answers.

Social work educators may find mastery learning most applicable in introductory or survey courses and courses where curriculum changes little each semester (e.g., research methods). Courses with regular curriculum changes will require creation of additional materials and testing. Mastery learning also may be applicable in distance learning courses where it can be important to prepare and distribute course materials to off campus sites before a distance learning session begins. Mastery learning may apply less easily to intervention methods or "skill" courses. However, in these courses students could still be required to rewrite process recordings and intervention plans or display interviewing skills repeatedly until reaching what an instructor decides is a level of mastery. It also could be argued that using supervision to develop student intervention skills is similar to the mastery learning "testing-correction-retesting" cadence, suggesting social work education already incorporates some behavioral learning principles evident in mastery learning.

The time required to set up mastery learning was not measured but the mastery instructor noted it as a negative. However, the time required for this implementation of mastery learning was not felt to be prohibitive. Mastery instruction required about

seven more hours of instructor time than non-mastery instruction but other social work educators may find ways to decrease the time spent during the semester. For example, students could take make-up exams outside class together from different courses, thus reducing the time spent proctoring make-up exams. Similarly, review sessions for different courses could be held together or students could lead the correctives and help correct each other.

Both students and the mastery instructor were clear about learning expectations and essential course content throughout the course. This is no small advantage for novice instructors or those preparing new materials for the first time. Social work instructors also may obtain greater achievement results as their experience with mastery learning increases. Mastery learning is a promising instructional method for social work education that provides a clear structure for both students and instructors, and insures instruction focuses on essential material.

REFERENCES

Abrams, J. (1979). Mastery learning in a smaller school system. Educational Leadership, 37(2), 136-139.

Anderson, C., L. (1965). Development of an objective measure of orientation toward public dependence. Social Forces, 44(1), 107-113.

Anderson, C., L. (1966). A preliminary study of generational economic dependency orientations. Social Forces, 45(4), 516-520.

Anderson, L., W. (1993). A functional analysis of Bloom's learning for mastery. Outcomes, 12(2), 14-18.

Arlin, M. (1984). Time, equality, and mastery learning. Review of Educational Research, 54(1), 65-86.

Aviles, C., B. (1996). A contrast study of mastery learning and non-mastery learning instruction in an undergraduate social work class. Unpublished Ph.D. Dissertation, SUNY at Albany.

Barber, C. (1979). Training principles and teachers for mastery learning. Educational Leadership, 37(2), 126-127.

Bauman, D., L. (1980). A mastery learning model applied to an undergraduate course in teacher education. Unpublished Ph.D. Dissertation, University of Alabama.

Bloom, B., S. (1956). Taxonomy of educational objectives: Cognitive domain. NY: Longman.

Bloom, B. S. (1968). Learning for mastery. UCLA-CSEIP Evaluation Comment, 1(2), 273-281.

Bloom, B., S. (1984). The search for methods of group instruction as effective as one-to-one tutoring. Educational Leadership, 41(8), 4-17.

Bloom, B., S, Hastings, J., & Madaus, G., F (Eds.). (1971). Handbook on formative and summative evaluation of student learning. NY: McGraw-Hill.

Brown, P. (1977). Using mastery learning in teaching college psychology classes. Unpublished Doctoral Dissertation, Educational Psychology Department, Brigham Young University.

Burns, R., B. (1987). Models of instructional organization: A casebook on mastery learning and outcome-based education. San Francisco, CA: Far West Laboratory for Educational Research and Development.

Butler, B., & Elliot, D. (1985). Teaching and learning for practice. Brookfield, VT: Gower.

Campbell, D., T, & Stanley, J., C. (1966). Experimental and quasi-experimental designs for research. Boston, MS: Houghton Mifflin.

Carroll, J., B. (1963). A model of school learning. Teachers College Record, 64(8), 723-733.

Clandinin, D. J., & Connelly, F. M. (1994). Personal experience methods. In N. K. Denzin & Y. S. Lincoln (Eds.), Handbook of qualitative research (1st ed., pp. 413-427). Thousand Oaks, CA: Sage.

Cohen, A., & Hyman, J. (1991). New alignment experiments: Using outcome-based instruction to teach transfer of learning. Outcomes, 10(3), 11-16.

Cornfield, J., & Tukey, J., W. (1956). Average values of mean squares in factorials. The Annals of Mathematical Statistics, 27, 907-949.

Decker, D., F. (1976). Teaching to achieve learning mastery by using re-testing techniques. (ERIC Document Reproduction Service No. ED 133 002).

Decker, B. (1989). Implementation of mastery learning and organizational characteristics that may affect implementation. Unpublished Doctoral Dissertation, Columbia University, NY.

Dolon, R., Blakely, B., & Hendricks, J., E. (1988). Teaching social work practice: A study of innovative teaching methods in an undergraduate social work program. Arete, 13(1), 35-42.

Dunkin, M., J, & Barnes, J. (1986). Research on teaching in higher education. In M. Wittrock C (Ed.), Handbook of research on teaching (3rd ed., pp. 754-777). NY: Macmillan.

Dunkle, S., E. (1984). Use of mastery learning approach in allied health programs: Emergence of higher education. (ERIC Document Reproduction Service No. ED 260 606).

Dunkleberger, G., E, & Knight, C., W. (1979). Cognitive consequences of mastery learning via computer-generated repeatable tests. Journal of Educational Research, 72(5), 270-272.

Fehlen, J., E. (1976). Mastery learning techniques in the traditional classroom setting. School Science and Mathematics, 76(3), 241-245.

Feldman, Y. (1958). Learning through recorded material. In H. Parad J (Ed.), Ego psychology and dynamic casework (pp. 203-215). NY: Family Service Association of America.

Fitzpatrick, K., A. (1985). Group-based mastery learning: A robin hood approach to instruction? (ERIC Document Reproduction Service No. ED 255 556).

Gentile, J., R. (1990). Educational psychology. Duburque, IO: Kendall\Hunt.

Glass, G., V, & Stanley, J., C. (1970). Statistical methods in education and psychology. Englewood Cliffs, NJ: Prentice Hall.

Glass, G. V., McGraw, B., & Smith, M. L. (1981). Meta-analysis in social research. Beverly Hills, CA: Sage.

Goldwater, B., C, & Acker, L., E. (1975). Instructor paced, mass testing for mastery performance in an introductory psychology course. Teaching of Psychology, 2(4), 152-155.

Goldwater, B., C, & Acker, L., E. (1975). Instructor paced, mass testing for mastery performance in an introductory psychology course. Teaching of Psychology, 2(4), 152-155.

Gronlund, N., G. (1981). Measurement and evaluation in teaching (4th ed.). NY: Macmillan.

Guskey, T., R. (1985). Implementing mastery learning. Belmont, CA: Wadsworth.

Guskey, T., R. (1987). Defining the essential elements of mastery learning. Outcomes, 6(1), 30-34.

Guskey, T., R. (1988). Improving student learning in college classrooms. Springfield, IL: Charles Thomas.

Guskey, T., R, & Pigott, T., D. (1988). Research on group based mastery learning programs: A meta-analysis. Journal of Educational Research, 81(4), 197-216.

Guskey, T., R, Benninga, J., S, & Clark, C., R. (1984). Mastery learning and students' attributions at the college level. Research in Higher Education, 20(4), 491-498.

Honeycutt, J., K. (1974). The effects of computer managed instruction on content learning of undergraduate students. (ERIC Document Reproduction Service No. ED 089 682).

Howard, T., U, & Flaitz, J. (1982). A scale to measure humanistic attitudes of social work students. Social Work Research and Abstracts, 18(4), 11-18.

Katz, D. (1979). Laboratory training to enhance interviewing skills. In F. Clark & M. Arkava (Eds.), The pursuit of competence in social work (pp. 205-226). San Francisco, CA: Jossey-Bass.

Kilpatrick, A., C, Thompson, K., H, Jarrett, H., H, & Anderson, R., J. (1984). Social work education at the university of Georgia. In M. Knowles (Ed.), Andragogy in action (pp. 243-263). San Francisco, CA: Jossey-Bass.

Klein, J. (1979). Designing a mastery learning program. Educational Leadership, 37(2), 144-147.

Kulik, C., C, Kulik, J., A, & Bangert-Drowns, R., L. (1990). Effectiveness of mastery learning programs: A meta-analysis. Review of Educational Research, 60(2), 265-299.

Lee, P., R, & Kenworthy, M., E. (1929). Mental hygiene and social work. NY: The Commonwealth Fund.

Levine, D., U. (1985). Key considerations for achieving success in mastery learning programs. In D. Levine (Ed.), Improving student achievement through mastery learning programs (pp. 273-294). San Francisco, CA: Jossey-Bass.

Lewis, E., W. (1984). The effects of a mastery learning strategy and an interactive quiz strategy on student achievement and attitude in college trigonometry. Unpublished Doctoral Dissertation, Memphis State University, TN.

Lincoln, Y., S, & Guba, E., G. (1985). Naturalistic Inquiry. Beverly Hills, CA: Sage.

Lowy, L., Bloksberg, L., M, & Walberg, H., J. (1971). Integrative learning and teaching in schools of social work. NY: Association Press.

Lubin, A. (1961). The interpretation of significant interaction. Educational and Psychological Measurement, 21(4), 807-817.

McKeachie, W., J. (1963). Research on teaching at the college and university level. In N. Gage L (Ed.), Handbook of research on teaching (1st ed., pp. 1118-1172). Chicago, IL: Rand McNally.

Moran, J., R. (1989). Social work education and students' humanistic attitudes. Journal of Social Work Education, 25(1), 13-22.

Nepote-Adams, S. (1991). Enhancing mastery learning with instructional technologies. Outcomes, 10(3), 17-20.

Omelich, C., L, & Covington, M., L. (1981). Why does behavioral instruction work? A component analysis of performance and motivational outcomes. (ERIC Document Reproduction Service No. ED 213 329).

Orten, J., D. (1979). Experimentally influenced changes in students' attitudes toward the poor. Unpublished Doctoral Dissertation, University of Alabama.

Palardy, J., M. (1986). Mastery learning: A mixed view. Education, 107(4), 424-427.

Palardy, J., M. (1986). Mastery learning: A mixed view. Education, 107(4), 424-427.

Perlman, H., H. (1949). Teaching casework by the discussion method. Social Service Review, 24, 334-346.

Perlman, H., H. (1951). The lecture as a method in teaching case work. Social Service Review, 25, 19-32.

Peterson, J., H. (1967). A disguised structured instrument for the assessment of attitudes toward the poor. Unpublished Doctoral Dissertation, University of Oklahoma, OK.

Robb, D., W. (1985). Strategies for implementing successful mastery learning programs: Case studies. In D. Levine (Ed.), Improving student achievement through mastery learning programs (pp. 255-274). San Francisco, CA: Jossey-Bass.

Roid, G., H, & Haladyna, T., M. (1982). A technology for test item writing. NY: Academic Press.

Rosenthal, B., S. (1993). Graduate social work students' beliefs about poverty and attitudes toward the poor. Journal of Teaching in Social Work, 7(1), 107-121.

Sharwell, G., R. (1974). Can values be taught? A study of two variables related to orientation of social work graduate students toward public dependency. Journal of Education for Social Work, 10(2), 99-105.

Squires, D., A. (1986). Curriculum development within a mastery learning framework. (ERIC Document Reproduction Service No. ED 275 059).

Trent, J., W, & Cohen, A., M. (1973). Research on teaching in higher education. In R. Travers M (Ed.), Handbook of research on teaching (2nd ed., pp. 997-1071). Chicago, IL: Rand McNally.

Tufts, J., H. (1923). Education and training for social work. NY: Russel Sage Foundation.

Whiting, B., & Render, G., F. (1984). Cognitive and affective outcomes of mastery learning: A review of 16 semesters. (ERIC Document Reproduction Service No. ED 254 528).

Wire, D., R. (1979). Mastery learning program, Durham College: Report on progress during the first year. (ERIC Document Reproduction Service No. ED 187 387).

Wright, H., R. (1954). Social work education: Problems for the future. In C. Kasius (Ed.), New directions for social work (pp. 176-193). NY: Harper & Brothers.

Zastrow, C., & Navarro, R. (1979). Using videotaped role playing to assess and develop competence. In F. Clark & M. Arkava (Eds.), The pursuit of competence (pp. 190-204). San Francisco, CA: Jossey-Bass.